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The present invention provides for a transgenic non-human animal whose cells contain a DNA sequence comprising: (a) a nerve tissue specific promoter operatively linked to a DNA sequence which encodes amyloid-beta peptide alcohol dehydrogenase (ABAD), and (b) a nerve tissue specific promoter operatively linked to a DNA sequence encoding a mutant human amyloid precursor protein hAPP695, hAPP751 and hAPP770 bearing mutations linked to familial Alzheimer's disease in humans, wherein said non-human animal exhibits at least one phenotype from the group consisting of: reduced basal synaptic transmission; inhibited synaptic plasticity; increased neuronal stress; elevated 4-hydroxynonenal in cerebral cortex; increased heme oxygenase type I in cerebral cortex; decreased synaptophysin in cerebral cortex; decreased microtubule-associated protein 2 in cerebral cortex; and increased levels of activated caspase 3 antigen in cortical neurons.

[illegible]